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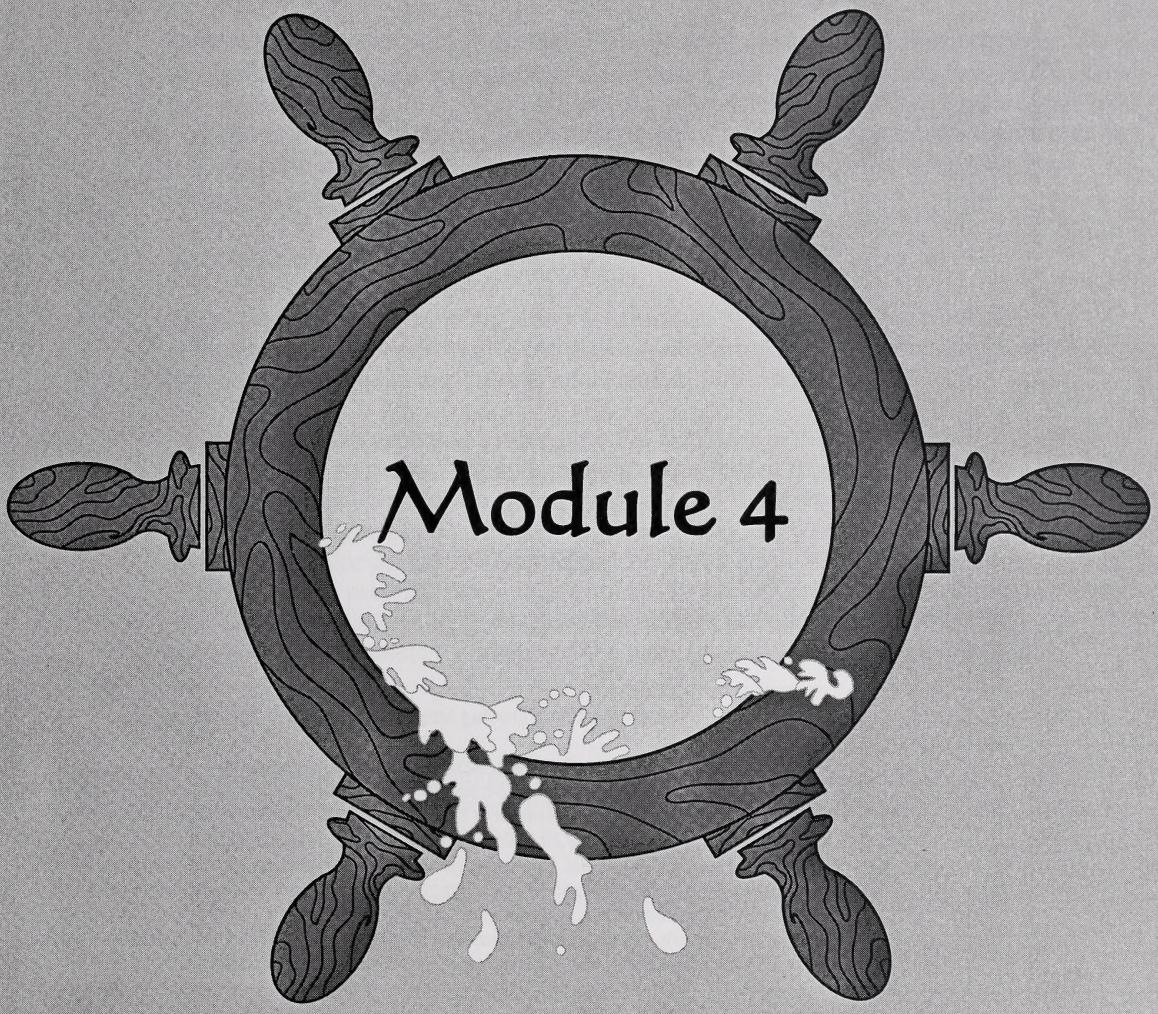
Mathematics 5



Module 4

Home Instructor's Guide and Assignment Booklet 4A

Learning Technologies Branch

Alberta LEARNING

Mathematics 5
Module 4: Transformations
Home Instructor's Guide and Assignment Booklet 4A
Learning Technologies Branch
ISBN 0-7741-2031-2

This document is intended for	
Students	✓
Teachers	✓
Administrators	
Home Instructors	✓
General Public	
Other	

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Module 4: Transformations

Overview

Module 4 focuses on motion geometry. There are three lessons in this module. In these lessons, students learn to recognize slides, turns, and flips in everday life, such as when giving directions or looking at reflections in a mirror. Students also explore tessellations, and see how these patterns can be used to solve practical and decorative problems in nature and in daily life. As well, students investigate ordered pairs in locating and identifying points in the first quadrant.

Assessment

At the end of each of the three lessons in Module 4, the student will be directed to complete an assignment in one of the two Assignment Booklets. The assignments will be graded by the teacher and have a total value of 90 marks.

Students are also expected to complete the Numbers in the News project. This project has a value of 10 marks. Encourage the student to look through a newspaper at least once a week for items on the Scavenger Hunt list. Read through the list with your student and suggest that he or she begin collecting samples of the ideas that he or she already understands. Other samples can be collected as ideas are introduced or extended in the module. Encourage your student to collect as many samples as he or she wishes. At the end of the module, the student will need to choose at least one sample for each question and submit the samples with the Assignment Booklet.

Pacing

The module has been designed so that students can work at their own pace. Each lesson, including the lesson assignment, will take the average student about one week to complete. The Challenge Activity in each lesson is optional.

Allowing extra time for review of basic facts and project work, Module 4 will take students 3 to 4 weeks to complete.

Lesson 1: Slides, Turns, and Flips

Overview

In this lesson students are introduced to motion geometry through the investigation of slides, flips, and turns. These ideas are reinforced through the use of everyday applications, such as giving directions or looking in a mirror.

Special Requirements

You may gather the following materials for your student to use in this lesson:

- small rectangular mirror
- scissors
- tracing paper
- pin or tack

Students also need access to a wall mirror.

Sharing Time

Students are asked to discuss what they are learning with their home instructor once in Lesson 1—at the end of Activity 3.

This Sharing Time exercise is open-ended so answers will vary. However, a sample response is given.

Activity 3 Sharing Time

The digits 0, 1, and 8 possess both vertical and horizontal line symmetry as well as point symmetry. The digit 3 has horizontal line symmetry.

Lesson 2: Tessellations

In this lesson students explore tessellations by investigating various shapes that can be used to cover a surface. The resulting patterns are used to solve problems in nature and in everyday life.

Special Requirements

You may gather the following materials for your student to use in this lesson:

- pattern blocks
- cardboard
- scissors
- crayons, coloured pencils, or felt pens

Sharing Time

Students are asked to discuss what they are learning with their home instructor once in Lesson 2—at the end of Activity 1.

This Sharing Time exercise is open-ended, so answers will vary. However, a sample response is given.

Activity 1 Sharing Time

Practice and Homework Book, page 101

Examples of tessellations around the home and in the immediate neighbourhood could include kitchen and bathroom tiles, fabric patterns, brickwork, wallpaper designs, and window panes.

ASSIGNMENT BOOKLET 4A

Mathematics 5

Module 4: Lesson 1 Assignment and Lesson 2 Assignment

Home Instructor's and Student's Comments:

STUDENT FILE NUMBER
(if label is missing or incorrect)

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_____

Apply Module Label Here

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_____

Teacher's Comments

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Teacher's Signature

Home Instructor: Keep this sheet when it is returned to you as a record of the student's progress.

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- Has your work been reread to be sure the spelling and details are correct?
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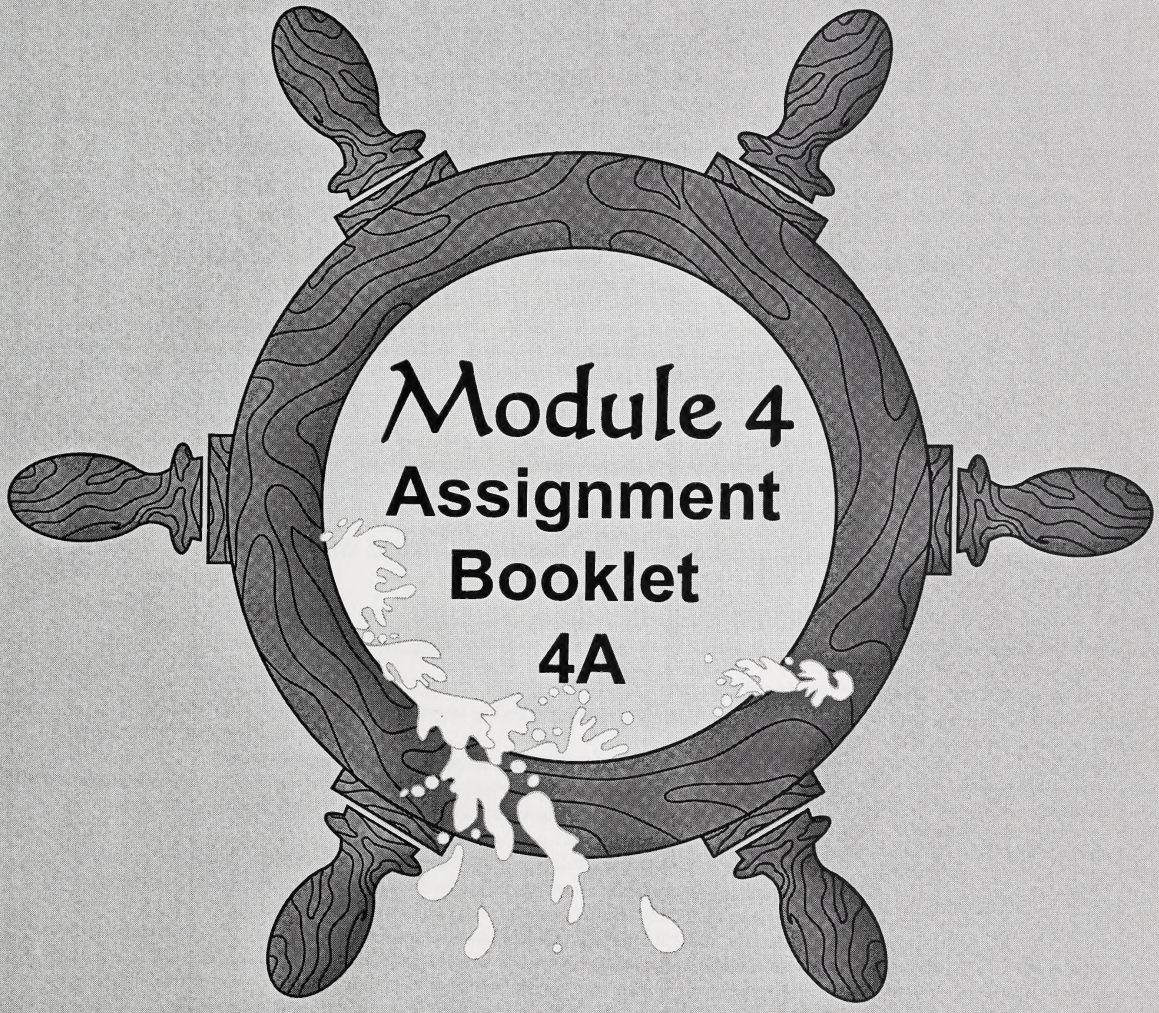

Module 4
Assignment Booklet 4A

Transformations

Learning Technologies Branch

Alberta LEARNING

FOR TEACHER'S USE ONLY

Summary

	Total Possible Marks	Your Mark
Lesson 1 Assignment	30	
Lesson 2 Assignment	30	
	60	

Teacher's Comments

Mathematics 5
Module 4: Transformations
Assignment Booklet 4A
Lesson 1 Assignment and Lesson 2 Assignment
Learning Technologies Branch

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ASSIGNMENT BOOKLET 4A
MATHEMATICS 5—MODULE 4: TRANSFORMATIONS

Your mark on this module will be determined by how well you do your assignments in the Assignment Booklets.

Work slowly and carefully. If you are having difficulties, go back and review the appropriate lessons.

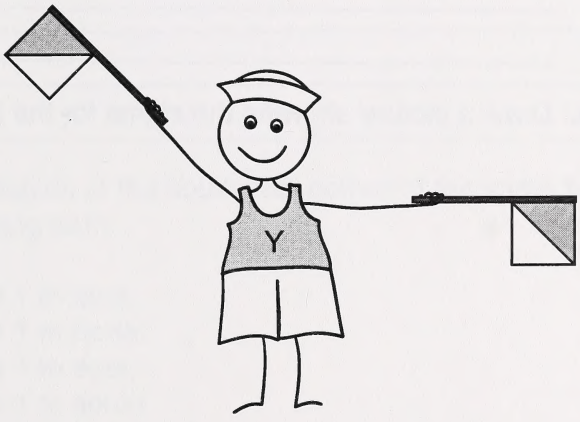
There are two lesson assignments in this Assignment Booklet. The total value of these assignments is 60 marks. The value of each assignment is stated in the left margin.

Be sure to proofread each assignment carefully.

(30)

Lesson 1 Assignment: Slides, Turns, and Flips

1. The picture below shows a sailor signalling the letter Y.



(2) **a.** Describe the hand positions for the letter Y.

_____

_____

(2) **b.** If you face the sailor and "mirror" his signal, you will signal the letter Q. Describe the hand positions for the letter Q.

_____

_____

(2) **c.** Draw a picture showing the signal for the letter Q.

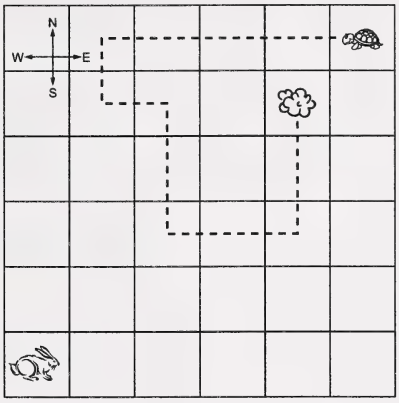
(2) **d.** To signal the letter K immediately after signaling the letter Y, a sailor can make a quarter turn up with his left hand and a quarter turn down with his right hand. Describe the hand positions for the letter K.

_____

_____

(2) **e.** Draw a picture showing the signal for the letter K.

(4) **2. a.** The grid shows the path of a turtle that began at the northeast corner of a square field and ended at the tree. Describe the turtle's path. **Note:** The side of each square on the grid represents 1 m.



(4) **b.** A rabbit begins at the southwest corner of the same field and takes the following path:

- Slide 1 m east.
- Slide 1 m north.
- Slide 1 m east.
- Slide 1 m south.
- Slide 1 m east.
- Slide 1 m north.
- Slide 1 m east.
- Slide 1 m south.
- Slide 1 m east.
- Slide 4 m north.
- Slide 1 m west, ending at the tree.

Draw the rabbit's path on the grid.

(2) **c.** If the rabbit and the turtle both travel at the same speed, which one would reach the tree first? Explain.

_____

_____

_____

(1) **3. a.** In the word that is shown below, predict which letters will look the same when it is held up to a mirror. Explain.

HOUND

_____

_____

(3) **b.** Which of the letters have vertical line symmetry? Use pictures to show the lines of symmetry.

(3) **c.** Which of the letters have horizontal line symmetry? Use pictures to show the lines of symmetry.

(3) **d.** Which of the letters have point symmetry? Use pictures to explain.

30

8

Lesson 2 Assignment: Tessellations

1. Turn to page 231 of your textbook. For each of the four pictures shown magnified in More Tessellations, explain why each picture does or does not show a tessellation.

a. First picture (wallpaper): _____

_____

b. Second picture (bed cover): _____

_____

c. Third picture (tablecloth): _____

_____

d. Fourth picture (floor): _____

_____

Use your pattern blocks to answer questions 2, 3, and 4.

2. Deepika's patio is made from cement blocks that are all shaped like regular hexagons. She removed a cracked block from the centre of her patio, but could not get a block the same shape to replace it.

6

a. Draw pictures to show three possible ways Deepika could use the following shapes of new blocks to replace the cracked block: the red trapezoid, the blue rhombus, the orange square, the tan trapezoid, and the green triangle. She can use any single shape of block or any combination of blocks to fit the space.

There is more space on the next page for your pictures.

(4) **b.** Which of the shapes cannot be used in any way to replace the cracked hexagon? Explain why it is not possible to use these shapes.

_____

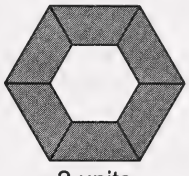
_____

_____

_____

(6) **3.** Begin with a yellow hexagon and think of the length of each side as 1 unit. Using red trapezoids, you can build onto the yellow hexagon to make a larger hexagon that has sides 2 units long.

1 unit

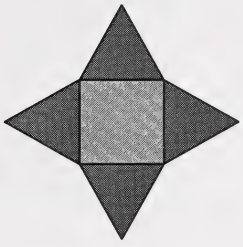


2 units

You can keep using red trapezoids to build larger and larger hexagons. Each time, the length of the sides will increase by 1 unit. Draw pictures to show how you can use red trapezoids to build the next two larger hexagons.

There is more space on the next page for your pictures.

(6) **4.** Randy used ceramic tiles shaped like the orange square and the green triangle to create a four-pointed star shape, as shown below.



He tried to cover a wall by sliding the star shape. Make Randy's star shape with pattern blocks and trace it to make a paper cutout. Randy realized that his star shapes would not tessellate if used by themselves. Draw pictures to show two different ways that Randy can slide his star shape to cover the wall if he chooses another shape (like one of the pattern blocks) to fill in the gaps.

There is more space on the next page for your pictures.

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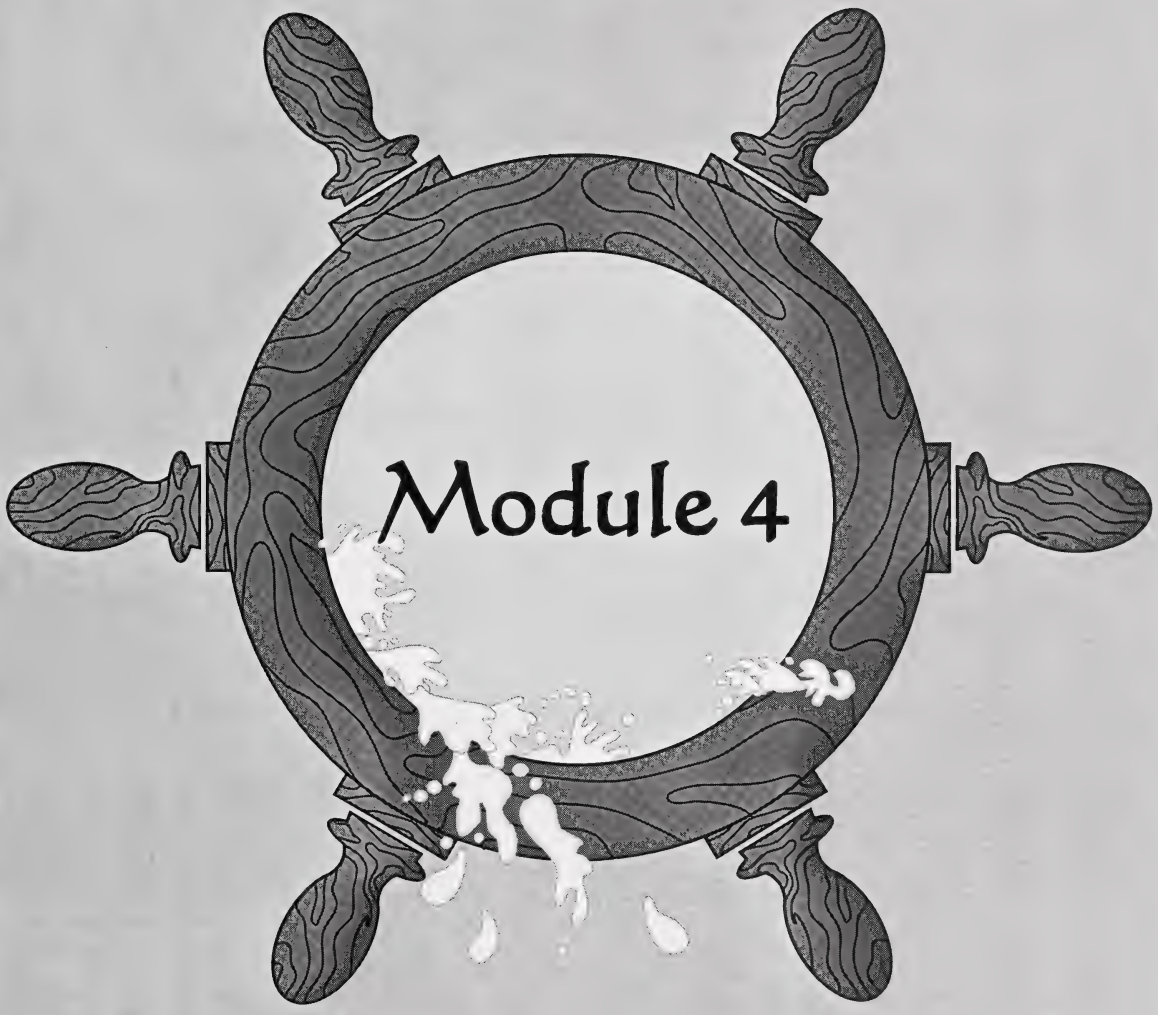
Mathematics 5



Home Instructor's Guide and Assignment Booklet 4B

Learning Technologies Branch

Alberta LEARNING

Mathematics 5
Module 4: Transformations
Home Instructor's Guide and Assignment Booklet 4B
Learning Technologies Branch
ISBN 0-7741-2032-0

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Teachers	✓
Administrators	
Home Instructors	✓
General Public	
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Lesson 3: Plotting Points

Overview

In this lesson students use ordered pairs to plot and identify points in the first quadrant of the coordinate plane.

Special Requirements

You may gather the following materials for your student to use in this lesson:

- 1-cm grid paper
- ruler

Sharing Time

Students are asked to discuss what they are learning once in Lesson 3—at the end of Activity 3.

Activity 3 Sharing Time

This Sharing Time exercise is open-ended, so answers will vary. Ensure that your student knows how to read an ordered pair and plot a point on a grid.

Module Summary

In the Module Summary students are asked to complete the Numbers in the News Project and send the completed project with Assignment Booklet 4B to the teacher.

Following the Module Summary are Keystrokes and Review. These special activities can be assigned at a later time to review the module ideas and prepare for the final test.

ASSIGNMENT BOOKLET 4B

Mathematics 5
Module 4: Lesson 3 Assignment and Numbers in the News

Home Instructor's and Student's Comments:

STUDENT FILE NUMBER
(if label is missing or incorrect)

_____

Date Submitted:

_____

Apply Module Label Here

Name

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Teacher's Comments

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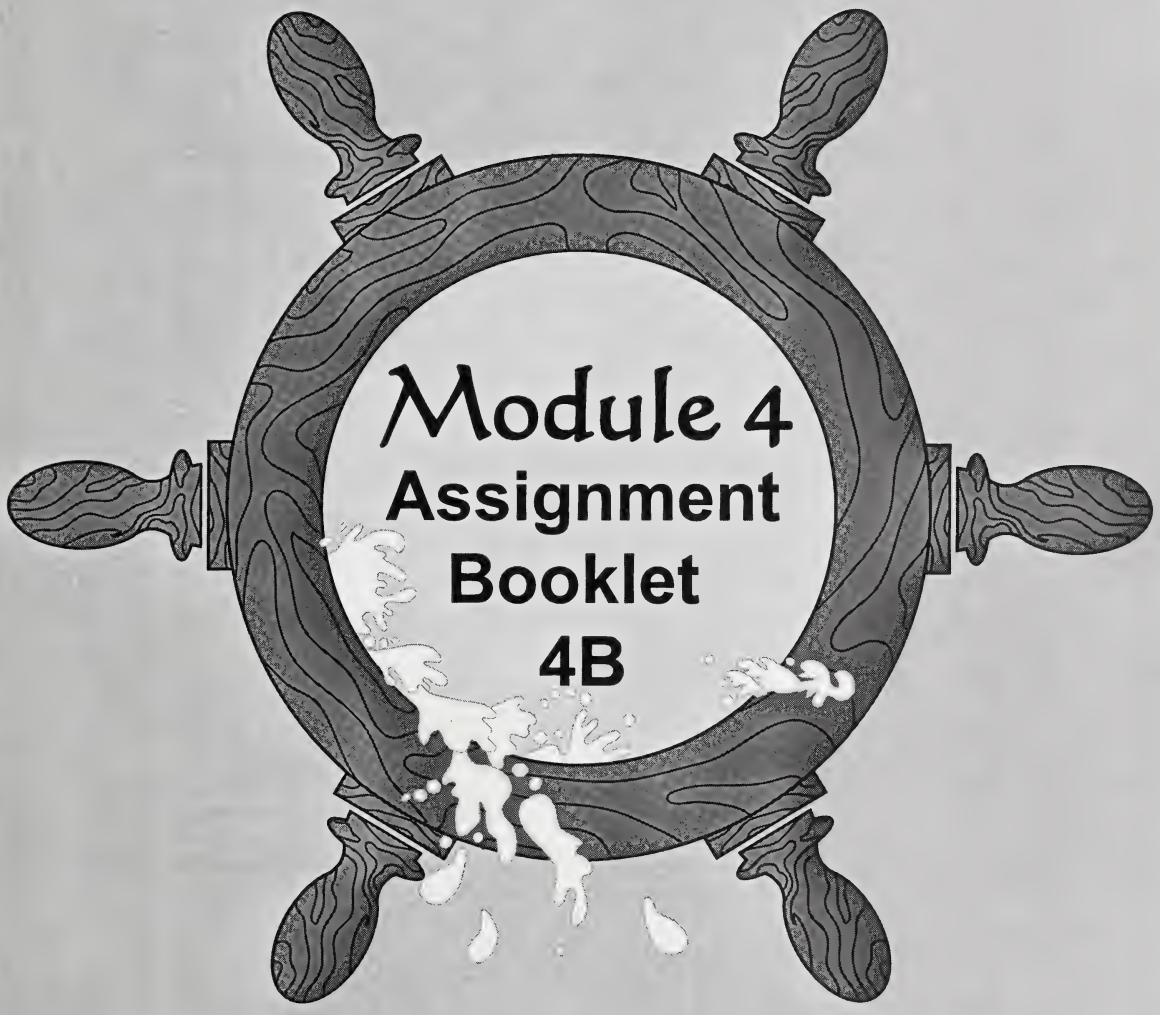
Mathematics 5



Module 4
Assignment Booklet 4B

Transformations

Learning Technologies Branch

Alberta LEARNING

FOR TEACHER'S USE ONLY

Summary

	Total Possible Marks	Your Mark
Lesson 3 Assignment	30	
Numbers in the News	10	
	40	

Teacher's Comments

Mathematics 5
Module 4: Transformations
Assignment Booklet 4B
Lesson 3 Assignment and Numbers in the News
Learning Technologies Branch

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Your mark on this module will be determined by how well you do your assignments in the Assignment Booklets.

Work slowly and carefully. If you are having difficulties, go back and review the appropriate lessons.

There is one lesson assignment and a Numbers in the News project in this Assignment Booklet. The total of these lesson assignments is 40 marks. The value of each assignment is stated in the left margin.

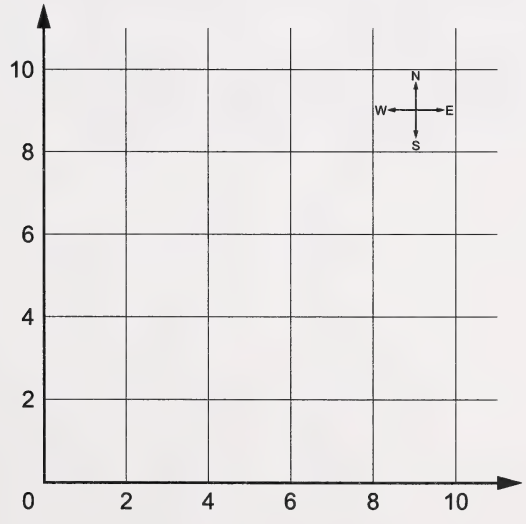
Be sure to proofread each assignment carefully.

30

Lesson 3 Assignment: Plotting Points

3

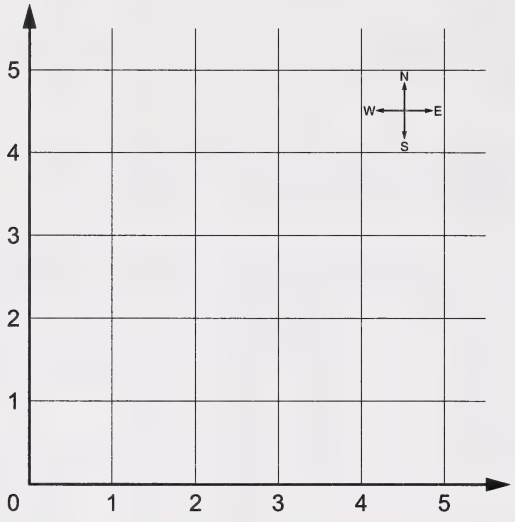
1. a. The grid below shows a treasure map. Plot and label a tree at $(2, 6)$, a boulder at $(8, 6)$, and a tree at $(8, 2)$.



2

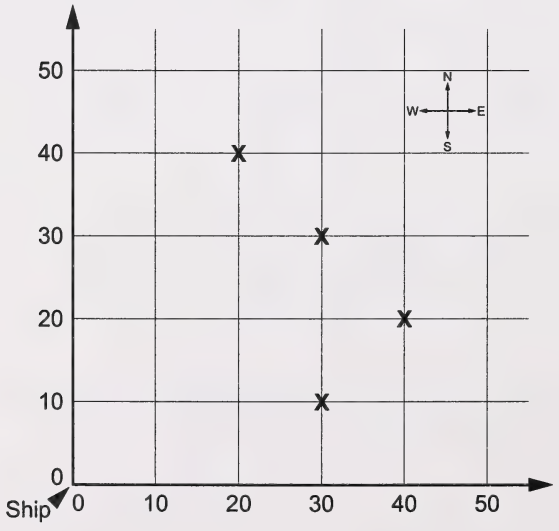
b. The treasure is buried at a point that forms a rectangle with the trees and the boulder. Plot and label the point where the treasure is buried.

(2) **2. a.** The grid below shows another treasure map. Plot and label two trees on it: one at $(1, 2)$ and the other at $(3, 2)$.



(3) **b.** The treasure is buried at a point that forms a triangle with the trees. The point is an equal distance from each tree. Plot and label three possible points where the treasure may be buried.

(4) **3. a.** A third treasure map is shown below. Use ordered pairs to label each of the points marked with an x. Each x represents a possible point where the treasure is buried.



(2) **b.** The ship is located at the origin. The point where the treasure is buried is closest to the ship if the sailors travel along the grid lines. Circle the point where the treasure is buried.

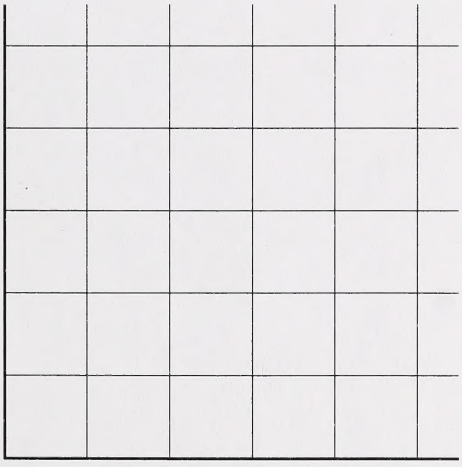
(2) **c.** How far must the sailors carry the treasure back to the ship if they must travel along the grid lines? (The distances are in metres.)

_____

_____

4. Study the following points: $(3, 8)$, $(17, 21)$, $(25, 5)$, $(10, 5)$, and $(1, 23)$.

(4) **a.** Choose and label a scale on the grid below that uses multiples of either 1, 2, 5, or 10 so that when the points are plotted there will be as much room between them as possible.



(5) **b.** Plot and label the points using the scale you chose.

(1) **c.** Use a ruler to connect one point to the next, starting from the first point listed and ending by connecting the last point to the first one.

(2) **d.** Estimate the coordinates of the point where the lines connecting the points cross.

_____

10

Numbers in the News

Scavenger Hunt

Go through the scavenger hunt list for Module 4 to make sure you have clipped at least one sample for each question. Ask your home instructor to check the sample you wish to use, and label each one with the scavenger hunt number it matches. Organize your samples and put them together with any other information required. Submit your project with this Assignment Booklet.

Ask yourself the following questions:

- Is my Numbers in the News project complete? (Have I included all my samples?)
- Do my samples show the ideas clearly? (Are my examples appropriate?)
- Did I take care to be neat when organizing and labelling my work?

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